North Dakota Botany/Horticulture Science

Content Standards

Approved and Adopted
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North Dakota Department of Career and Technical Education
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The North Dakota State Board for Career and Technical Education has reviewed this standards document, approved the content, and officially adopted the material until 2010.

North Dakota
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North Dakota

Botany/Horticulture Science Standards

Introduction

The North Dakota Department of Career and Technical Education is committed to working on standards to ensure that each program area can offer courses that allow students to acquire knowledge and skills. CTE not only provides technical skills and knowledge for students to succeed in careers, but also cross-functional workplace skills such as teamwork, problem solving, and the ability to find and use information, and provides the context in which traditional educational goals and academic skills can be enhanced.

The standards process is one that directly involves the state supervisor(s), the curriculum administrator for this agency, and teachers working directly with the content at hand. Once the standards are written and expectations are clearly defined, the standards are then compared and aligned with national and industry standards.

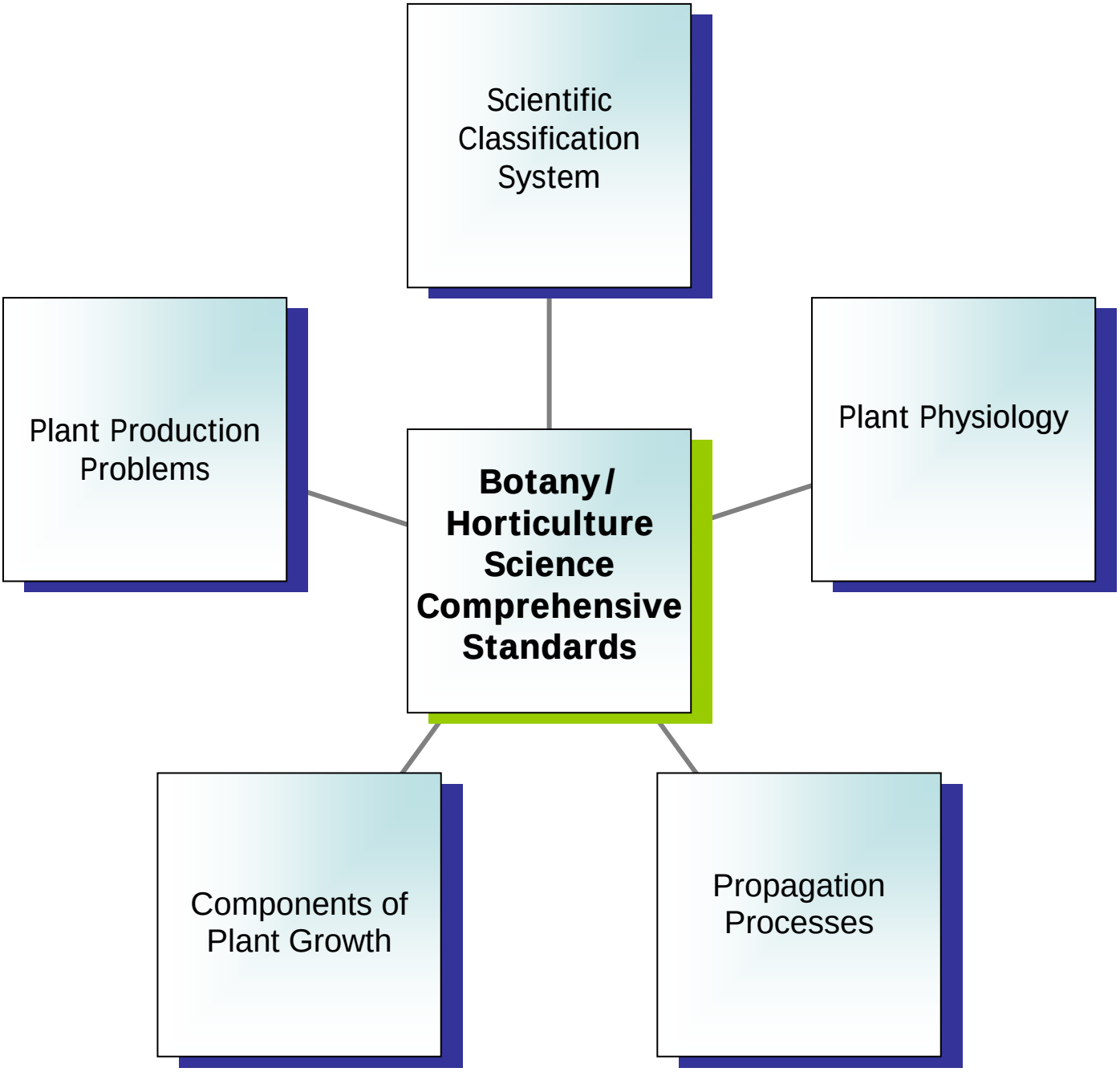
The Department of Career and Technical Education strongly believes in the importance of academic integration within each program area. The standards produced for each program area will be cross walked with the most current academic drafts of English Language Arts, Mathematics, and Science. When possible, standards will be cross walked with other academic areas that correspond.

Definitions

For each standard, there is one or more topic statements along with competencies for each topic. The competencies are categorized into three divisions: Introductory, Core, and Advanced. These divisions can further be defined as:

Introductory:	Knowledge Acquisition—Learners at this level expand awareness and build comprehension of knowledge.
Core:	Application—Learners at this level experience acquired knowledge by applying it to situations and self.
Advanced:	Reflection—Learners at this level analyze, synthesize, judge, assess, and evaluate knowledge in accord with their own goals, values, and beliefs, and/or real situations.

Overview of Standards



Standards at a Glance

COMPREHENSIVE STANDARDS

1.0 SCIENTIFIC CLASSIFICATION SYSTEM
- Categorize plants by use, purpose, and position within the scientific classification system.

2.0 PLANT PHYSIOLOGY
- Understand plant physiology.

3.0 PROPAGATION PROCESSES
- Recognize propagation processes of plants.

4.0 COMPONENTS OF PLANT GROWTH
- Understand the major components for plant growth.

5.0 PLANT PRODUCTION PROBLEMS
- Relate problems to plant production.

Standards with Topics

CONTENT STANDARDS

1.0 SCIENTIFIC CLASSIFICATION SYSTEM

- Categorize plants by use, purpose, and position within the scientific classification system.
  - 1.1 Recognize the binomial classification system.
  - 1.2 Distinguish plants by use and climate zones.
  - 1.3 Explore career opportunities in botany/horticulture field.

2.0 PLANT PHYSIOLOGY

- Understanding plant physiology.
  - 2.1 Identify plant parts and their functions.
  - 2.2 Examine plant processes.

3.0 PROPAGATION PROCESSES

- Recognize propagation processes of plants.
  - 3.1 Understand differences in plant reproduction.
  - 3.2 Recognize the importance and use of growth hormones.

4.0 COMPONENTS OF PLANT GROWTH

- Understand the major components for plant growth.
  - 4.1 Understand plant growth stages.
  - 4.2 Describe different types and uses of plant media.
  - 4.3 Select appropriate types and uses of plant containers.
  - 4.4 Explain the importance of fertilization and nutrition on plant growth.
  - 4.5 Relate environmental requirements to plant growth.

5.0 PLANT PRODUCTION PROBLEMS

- Relate problems to plant production.
  - 5.1 Recognize pests and diseases.
  - 5.2 Understand concepts of chemical application and sanitization for pest control.
  - 5.3 Examine concepts of Integrated Pest Management (IPM).

Standard 1: SCIENTIFIC CLASSIFICATION SYSTEM – Categorize plants by use, purpose, and position within the scientific classification system.

Topic 1: Recognize the binomial classification system.

Student Competencies

Introductory

1.1.1 Use binomial classifications.
1.1.2 Differentiate between monocots and dicots.

Core

1.1.3 Identify characteristics of annuals, perennials, and biennials.
1.1.4 Compare and contrast annuals, perennials, and biennials.

Advanced

1.1.5 Classify an unknown plant using the binomial classification system.

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Standard 1: SCIENTIFIC CLASSIFICATION SYSTEM – Categorize plants by use, purpose, and position within the scientific classification system.

Topic 2: Distinguish plants by use and climate zones.

Student Competencies

Introductory

1.2.1 Identify common landscape, floral, indoor, outdoor, and/or specialty plants.

Core

1.2.2 Select landscape, floral, indoor, outdoor, and/or specialty plants for specific uses.

1.2.3 Determine plant selections for climate zones.

Advanced

1.2.4 Design a farmstead or urban landscape plan.

1.2.5 Fabricate an end product using floral plants (e.g. corsage, arrangements, boutonnière, dish gardens, terrariums, etc.).

1.2.6 Apply the principles of turf establishment and maintenance.

1.2.7 Apply the principles of small fruit and vegetable gardening.

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
5. Integrity/Honesty→ Chooses ethical courses of action.

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Standard 1: SCIENTIFIC CLASSIFICATION SYSTEM – Categorize plants by use, purpose, and position within the scientific classification system.

Topic 3: Explore career opportunities in botany/horticulture field

Student Competencies

Introductory

1.3.1 Investigate careers available in this field.

Core

1.3.2 Link SAE areas to botany/horticulture.

1.3.3 Research professions within this field (e.g. interview professionals, skills required, job shadows, etc.).

Advanced

1.3.4 Encourage the establishment of SAE's in botany/horticulture.

Keys to Employability

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 1: SCIENTIFIC CLASSIFICATION SYSTEM – Categorize plants by use, purpose, and position within the scientific classification system.

Academic Cross Walk

English Language Arts

9.1.3	Cross-reference information
9.1.5	Organize information from a variety of sources
9.1.7	Identify and avoid plagiarism
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
11.1.1	Research topics independently using appropriate sources
11.1.2	Evaluate and incorporate information from primary sources
11.1.4	Verify the quality, accuracy, and usefulness of information
9.3.8	Use supporting details
9.3.10	Edit and revise compositions for proper mechanics and grammar, syntax, diction, and order
9.3.11	Arrange paragraphs in a logical progression
9.3.12	Use technology to present written work
10.3.7	Use a variety of supporting details
10.3.10	Use a specific point of view in compositions
11.3.5	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.4	Use variety of sources for supporting details
12.3.5	Elaborate ideas through word choice and description using grade-level vocabulary
10.5.2	Use media for a variety of purposes

Library/Technology Literacy

12.1.1	Define a research problem or task
12.1.2	Plan a research strategy
12.1.3	Access information using a variety of sources
12.1.4	Use a variety of criteria to evaluate and select information for research
12.1.5	Use organizational strategies to record and synthesize information
12.1.6	Present research
12.1.7	Evaluate the research process
12.2.1	Demonstrate awareness of audience when creating media products
12.2.2	Synthesize information to create a product that meets a specific need
12.2.3	Use a variety of criteria to evaluate media products
12.2.4	Use a variety of media and technology to communicate with communities beyond the school
12.3.1	Explain and use appropriate terminology and concepts associated with media and technology
12.3.2	Demonstrate advanced knowledge and skills in various media and technology
12.3.3	Apply strategies for identifying and solving routine hardware and software problems
12.3.4	Explain features and uses of current and emerging media and technology
12.4.1	Work cooperatively and collaboratively when using media and technology
12.4.2	Develop competence and selectivity in reading, listening, and viewing
12.4.3	Demonstrate self-motivation in seeking information.
12.4.4	Use a variety of media and technology for personal needs and enjoyment
12.5.1	Follow school policies for responsible use of information resources
12.5.2	Demonstrate proper form of citations and bibliographies
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format
12.5.4	Understand the impact of equitable access to information in a democracy

Standard 1: CLASSIFICATION SYSTEM—Categorize plants by use, purpose, and position within the scientific classification system.

Academic Cross Walk

Mathematics

9-10.1.1	Express numbers between one-billionth and one billion in fraction, decimal, and verbal form; express numbers of all magnitudes in scientific notation
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.11	Add, subtract, and perform scalar multiplication on matrices
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.2.3	Use trigonometric relationships and the Pythagorean Theorem to determine side lengths and angle measures in right triangles
9-10.2.6	Use distance, midpoint, and slope to determine relationships between points, lines, and plane figures in the Cartesian coordinate system
9-10.2.7	Identify and perform transformations of objects in the plane using sketches (translations, reflections, rotations, dilations) and coordinates (translations, reflections, dilations)
9-10.2.9	Construct plane figures using traditional and/or technological tools
9-10.2.10	Recognize images of the same object shown from different perspectives
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.14	Draw conclusions about a situation being modeled

Science

9-10.1.1	Understand the interaction of components within a system
11-12.1.1	Understand the structure, organization, and dynamics of components within a system
11-12.1.6	Understand how scientists create and use models to address scientific knowledge
9-10.2.2	Identify questions and concepts that guide scientific investigations
9-10.2.5	Design and conduct a guided investigation
11-12.2.7	Design and conduct an independent investigation
9-10.5.3	Know the short-term and long-term effects of physical processes on the environment and society
9-10.8.3	Understand the role of scientists in theoretical and applied science

Standard 2: PLANT PHYSIOLOGY – Understand plant physiology.

Topic 1: Identify plant parts and their functions.

Student Competencies

Introductory

2.1.1 Label basic plant parts.
2.1.2 Identify the vascular system (e.g. xylem, phloem, etc.).
2.1.3 Identify reproductive parts of plants.

Core

2.1.4 Correlate the plants part to its function.
2.1.5 Correlate the vascular system to its function.
2.1.6 Correlate the reproductive system to its function.

Advanced

2.1.7 Analyze plant parts in relation to its core functions (e.g. problem solving, flower dissection, etc.).

Keys to Employability

Basic Skills

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3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 2: PLANT PHYSIOLOGY—Understand plant physiology.

Topic 2: Examine plant processes.

Student Competencies

Introductory

2.2.1 Identify the plant processes (e.g. photosynthesis, respiration, and transpiration).

Core

2.2.2 Determine the relationship of water, nutrient and sunlight.

Advanced

2.2.3 Hypothesize the effects of growth regulators (e.g. selection and application).

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
5. Integrity/Honesty→ Chooses ethical courses of action.

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
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3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
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Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Standard 2: PLANT PHYSIOLOGY—Understand plant physiology.

Academic Cross Walk

English Language Arts

9.1.1	Choose a broad topic, state the problem, or question
9.1.3	Cross-reference information
9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
9.1.7	Identify and avoid plagiarism
9.1.9	Use graphic organizer
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
10.1.10	Write a research paper
10.1.11	Present research information; e.g., informative speech, PowerPoint presentation, video presentation
11.1.1	Research topics independently using appropriate sources
11.1.2	Evaluate and incorporate information from primary sources; e.g., interviews and surveys
11.1.4	Verify the quality, accuracy, and usefulness of information
11.1.5	Synthesize information in a logical sequence
12.1.1	Plan a research strategy
12.1.3	Develop a research question
12.1.4	Defend research paper or project
9.2.15	Build vocabulary by reading a variety of grade-level texts and applying new vocabulary
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.8	Use technical language/jargon to decipher meaning
10.3.7	Use a variety of supporting details
11.3.8	Incorporate visual aids (e.g., graphs, tables, and pictures) into written work to enhance meaning
12.3.4	Use variety of sources for supporting details
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.5.2	Access media for a variety of purposes
10.5.2	Use media for a variety of purposes

Library/Technology Literacy

12.1.1	Define a research problem or task
12.1.2	Plan a research strategy
12.1.3	Access information using a variety of sources
12.1.4	Use a variety of criteria to evaluate and select information for research
12.1.5	Use organizational strategies to record and synthesize information
12.1.6	Present research
12.1.7	Evaluate the research process
12.2.1	Demonstrate awareness of audience when creating media products
12.2.2	Synthesize information to create a product that meets a specific need
12.2.3	Use a variety of criteria to evaluate media products
12.2.4	Use a variety of media and technology to communicate with communities beyond the school
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12.3.2	Demonstrate advanced knowledge and skills in various media and technology
12.3.3	Apply strategies for identifying and solving routine hardware and software problems
12.3.4	Explain features and uses of current and emerging media and technology
12.4.1	Work cooperatively and collaboratively when using media and technology
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12.4.3	Demonstrate self-motivation in seeking information.
12.4.4	Use a variety of media and technology for personal needs and enjoyment
12.5.1	Follow school policies for responsible use of information resources
12.5.2	Demonstrate proper form of citations and bibliographies
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format
12.5.4	Understand the impact of equitable access to information in a democracy

Standard 2: PLANT PHYSIOLOGY—Understand plant physiology.

Academic Cross Walk

Mathematics

9-10.1.1	Express numbers between one-billionth and one billion in fraction, decimal, and verbal form; express numbers of all magnitudes in scientific notation
9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.3.1	Construct appropriate displays of given data
9-10.3.2	Interpret a given visual representation of a set of data
9-10.3.3	Identify the variable, sample, and population in a well-designed study
9-10.3.7	Calculate measures of central tendency and spread
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
11-12.3.2	Make predictions based on theoretical probabilities and experimental results
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure
9-10.4.3	Use approximations to compare the standard and metric systems of measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.8	Given a formula list, compute the area of a regular polygon
9-10.4.9	Given a formula list, compute the surface area and volume of a right prism, right cylinder, right pyramid, right cone, and sphere
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.2	Express relations and functions using a variety of representations
9-10.5.4	Perform the operations of addition, subtraction, multiplication, and division on algebraic functions

Mathematics (cont.)

9-10.5.7	Develop algebraic expressions, equations, or inequalities involving one or two variables to represent relationships found in various contexts
9-10.5.8	Manipulate algebraic expressions and equations using properties of real numbers
9-10.5.10	Solve a literal equation for a specified variable
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled

Standard 2: PLANT PHYSIOLOGY—Understand plant physiology.

Academic Cross Walk

Science

9-10.1.1	Understand the interaction of components within a system
11-12.1.1	Understand the structure, organization, and dynamics of components within a system
9-10.2.4	Identify the independent and dependent variables, the control, and the constants when conducting an experiment
9-10.2.5	Design and conduct a guided investigation
9-10.2.8	Understand that scientific investigations sometimes result in new ideas
11-12.2.4	Formulate and revise explanations based upon scientific knowledge and experimental data
11-12.2.7	Design and conduct an independent investigation
9-10.4.1	Relate cell function to cell structure
9-10.4.2	Relate the functions of cells in multicellular organisms to their cell type
9-10.4.6	Know how mitosis and meiosis differ
9-10.4.7	Apply the basic concepts of genetics to predict inherited
9-10.4.12	Compare and contrast photosynthesis and cellular respiration
11-12.4.1	Explain the importance of cell differentiation in the development of multicellular organisms
11-12.4.4	Understand that producers store the Sun's energy in organic molecules, and consumers use that energy for life processes
9-10.6.1	Use appropriate technologies and techniques to solve a problem

Standard 3: PROPAGATION PROCESSES – Recognize propagation processes of plants.

Topic 1: Understand differences in plant reproduction.

Student Competencies

Introductory

3.1.1 Distinguish differences between sexual and asexual reproduction.

3.1.2 Investigate methods of propagation.

Core

3.1.3 Recognize methods of manipulation of propagation such as layering, cuttings, grafting, micro-propagation, divisioning, budding, etc.

3.1.4 Describe the forms of natural pollination (e.g. insects, winds, animals, etc.).

Advanced

3.1.5 Demonstrate methods of manipulation of propagation such as layering, cuttings, grafting, micro-propagation, divisioning, budding, etc.

3.1.6 Research plant growth and reproduction using fast plants.

3.1.7 Analyze the methods of propagation to its economic importance (e.g. varietal changes, impact of propagation on industry, efficiency of reproduction relates to profitability).

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Information

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2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 3: PROPAGATION PROCESSES – Recognize propagation processes of plants.

Topic 2: Topic 2: Recognize the importance and use of growth hormones.

Student Competencies

Introductory

3.2.1 Identify hormones and growth regulators.

Core

3.2.2 Determine application, effects, and benefits of hormones and growth regulators.

Advanced

3.2.3 Research and experiment the application of hormones and growth regulators (e.g. problem solve plants not performing, rooting, etc.).

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
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4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Standard 3: PROPAGATION PROCESSES – Recognize propagation processes of plants.

Academic Cross Walk

English Language Arts

9.1.1	Choose a broad topic, state the problem, or question
9.1.3	Cross-reference information
9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
9.1.7	Identify and avoid plagiarism
9.1.9	Use graphic organizer
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
10.1.10	Write a research paper
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
11.1.2	Evaluate and incorporate information from primary sources
11.1.4	Verify the quality, accuracy, and usefulness of information
11.1.5	Synthesize information in a logical sequence
12.1.1	Plan a research strategy
12.1.3	Develop a research question
12.1.4	Defend research paper or project
9.2.15	Build vocabulary by reading a variety of grade-level texts and applying new vocabulary
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.8	Use technical language/jargon to decipher meaning
10.3.7	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.4	Use variety of sources for supporting details
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.5.2	Access media for a variety of purposes
10.5.2	Use media for a variety of purposes

Library/Technology Literacy

12.1.1	Define a research problem or task
12.1.2	Plan a research strategy
12.1.3	Access information using a variety of sources
12.1.4	Use a variety of criteria to evaluate and select information for research
12.1.5	Use organizational strategies to record and synthesize information
12.1.6	Present research
12.1.7	Evaluate the research process
12.2.1	Demonstrate awareness of audience when creating media products
12.2.2	Synthesize information to create a product that meets a specific need
12.2.3	Use a variety of criteria to evaluate media products
12.2.4	Use a variety of media and technology to communicate with communities beyond the school
12.3.1	Explain and use appropriate terminology and concepts associated with media and technology
12.3.2	Demonstrate advanced knowledge and skills in various media and technology
12.3.3	Apply strategies for identifying and solving routine hardware and software problems.
12.3.4	Explain features and uses of current and emerging media and technology.
12.4.1	Work cooperatively and collaboratively when using media and technology
12.4.2	Develop competence and selectivity in reading, listening, and viewing
12.4.3	Demonstrate self-motivation in seeking information
12.4.4	Use a variety of media and technology for personal needs and enjoyment
12.5.1	Follow school policies for responsible use of information resources
12.5.2	Demonstrate proper form of citations and bibliographies
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format
12.5.4	Understand the impact of equitable access to information in a democracy

Standard 3: PROPAGATION PROCESSES – Recognize propagation processes of plants.

Academic Cross Walk

Mathematics

9-10.1.1	Express numbers between one-billionth and one billion in fraction, decimal, and verbal form; express numbers of all magnitudes in scientific notation
9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.3.1	Construct appropriate displays of given data
9-10.3.2	Interpret a given visual representation of a set of data
9-10.3.3	Identify the variable, sample, and population in a well-designed study
9-10.3.7	Calculate measures of central tendency and spread
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
11-12.3.2	Make predictions based on theoretical probabilities and experimental results
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure, e.g., the effect of doubling one or more edges of a solid on its surface area and volume
9-10.4.3	Use approximations to compare the standard and metric systems of measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.8	Given a formula list, compute the area of a regular polygon
9-10.4.9	Given a formula list, compute the surface area and volume of a right prism, right cylinder, right pyramid, right cone, and sphere
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.2	Express relations and functions using a variety of representations
9-10.5.4	Perform the operations of addition, subtraction, multiplication, and division on algebraic functions

Mathematics (cont.)

9-10.5.7	Develop algebraic expressions, equations, or inequalities involving one or two variables to represent relationships found in various contexts
9-10.5.8	Manipulate algebraic expressions and equations using properties of real numbers
9-10.5.10	Solve a literal equation for a specified variable
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled

Standard 3: PROPAGATION PROCESSES – Recognize propagation processes of plants.

Academic Cross Walk

Science

9-10.1.1	Understand the interaction of components within a system
11-12.1.1	Understand the structure, organization, and dynamics of components within a system
11-12.1.6	Understand how scientists create and use models to address scientific knowledge
9-10.2.2	Identify questions and concepts that guide scientific investigations
9-10.2.3	Formulate a testable hypothesis for a simple investigation
9-10.2.4	Identify the independent and dependent variables, the control, and the constants when conducting an experiment
9-10.2.5	Design and conduct a guided investigation
9-10.2.6	Maintain clear and accurate records of scientific investigations
9-10.2.8	Understand that scientific investigations sometimes result in new ideas
9-10.2.7	Analyze data found in tables, charts, and graphs to formulate conclusions
11-12.2.2	Select and use appropriate instruments, measuring tools, and units of measure to improve scientific investigations
11-12.2.3	Use data from scientific investigations in order to accept or reject a hypothesis
11-12.2.4	Formulate and revise explanations based upon scientific knowledge and experimental data
11-12.2.6	Analyze data using appropriate strategies
11-12.2.7	Design and conduct an independent investigation
11-12.2.8	Communicate and defend a scientific argument
11-12.2.9	Understand that scientific explanations must adhere to criteria
11-12.2.10	Understand that new knowledge and methods emerge from different types of investigations and public communication among scientists
9-10.4.6	Know how mitosis and meiosis differ
9-10.6.1	Use appropriate technologies and techniques to solve a problem

Standard 4: COMPONENTS OF PLANT GROWTH – Understand the major components for plant growth.

Topic 1: Understand plant growth stages.

Student Competencies

Introductory

4.1.1 Recognize the differences of plant growth stages (e.g. germination, emergence, inflorescence, etc.).

Core

4.1.2 Label the different plant growth stages.

4.1.3 Plant seeds and observe different stages of growth.

Advanced

4.1.4 Relate the growth stage to proper timing of chemical/fertilizer application.

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Standard 4: COMPONENTS OF PLANT GROWTH – Understand the major components for plant growth.

Topic 2: Describe different types and uses of plant media.

Student Competencies

Introductory

4.2.1 Identify different growing media.

Core

4.2.2 Use proper growing media for appropriate plant growth and stage.

4.2.3 Prepare a proper media to a specific scenario.

Advanced

4.2.4 Design a hydroponics system.

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
5. Integrity/Honesty→ Chooses ethical courses of action.

Standard 4: COMPONENTS OF PLANT GROWTH – Understand the major components for plant growth.

Topic 3: Select appropriate types and uses of plant containers.

Student Competencies

Introductory

4.3.1 Determine proper size plant containers.

Core

4.3.2 Examine the relationships among container size, moisture capability, and plant size.

Advanced

4.3.3 Utilize containers to control the plant size.

Keys to Employability

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Standard 4: COMPONENTS OF PLANT GROWTH – Understand the major components for plant growth.

Topic 4: Explain the importance of fertilization and nutrition on plant growth.

Student Competencies

Introductory

4.4.1 List macro and micronutrients.
4.4.2 Identify the types of fertilizers available.

Core

4.4.3 Associate macro and micronutrients with the functions and effect on plant growth.
4.4.4 Understand applications of fertilizer (e.g. rates, regulations, safety, etc.).

Advanced

4.4.5 Apply proper nutrients to plants in a variety of growth stages.
4.4.6 Determine and solve plant growth problems with nutrients.
4.4.7 Test media for nutrient content.

Keys to Employability

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 4: COMPONENTS OF PLANT GROWTH – Understand the major components for plant growth.

Topic 5: Relate environmental requirements to plant growth.

Student Competencies

Introductory

4.5.1 Identify the basic requirements for plant growth (e.g. light, temperature, moisture requirements).

Core

4.5.2 Associate light, temperature, moisture requirements for plant type and optimum plant growth.

4.5.3 Categorize plants to proper pH levels.

Advanced

4.5.4 Foster optimum plant growth via pH manipulation.

4.5.5 Experiment with the growth of plants in a greenhouse environment.

Keys to Employability

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 4: COMPONENTS OF PLANT GROWTH – Understand the major components for plant growth.

Academic Cross Walk

English Language Arts

9.1.1	Choose a broad topic, state the problem, or question
9.1.3	Cross-reference information
9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
9.1.7	Identify and avoid plagiarism
9.1.9	Use graphic organizer
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
10.1.10	Write a research paper
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
11.1.2	Evaluate and incorporate information from primary sources
11.1.4	Verify the quality, accuracy, and usefulness of information
11.1.5	Synthesize information in a logical sequence
12.1.1	Plan a research strategy
12.1.3	Develop a research question
12.1.4	Defend research paper or project
9.2.15	Build vocabulary by reading a variety of grade-level texts and applying new vocabulary
9.2.16	
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.8	Use technical language/jargon to decipher meaning
10.3.7	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.4	Use variety of sources for supporting details
9.4.2	Use visual aides effectively in oral presentations
9.4.3	Use notes and manuscripts to make oral presentations
9.4.4	Engage in a group discussion
9.5.2	Access media for a variety of purposes
10.5.2	Use media for a variety of purposes

Library/Technology Literacy

12.1.1	Define a research problem or task
12.1.2	Plan a research strategy
12.1.3	Access information using a variety of sources
12.1.4	Use a variety of criteria to evaluate and select information for research
12.1.5	Use organizational strategies to record and synthesize information.
12.1.6	Present research
12.1.7	Evaluate the research process
12.2.1	Demonstrate awareness of audience when creating media products
12.2.2	Synthesize information to create a product that meets a specific need
12.2.3	Use a variety of criteria to evaluate media products
12.2.4	Use a variety of media and technology to communicate with communities beyond the school
12.3.1	Explain and use appropriate terminology and concepts associated with media and technology
12.3.2	Demonstrate advanced knowledge and skills in various media and technology
12.3.3	Apply strategies for identifying and solving routine hardware and software problems
12.3.4	Explain features and uses of current and emerging media and technology
12.4.1	Work cooperatively and collaboratively when using media and technology
12.4.2	Develop competence and selectivity in reading, listening, and viewing
12.4.3	Demonstrate self-motivation in seeking information
12.4.4	Use a variety of media and technology for personal needs and enjoyment
12.5.1	Follow school policies for responsible use of information resources
12.5.2	Demonstrate proper form of citations and bibliographies
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format
12.5.4	Understand the impact of equitable access to information in a democracy

Standard 4: COMPONENTS OF PLANT GROWTH – Understand the major components for plant growth.

Academic Cross Walk

Mathematics

9-10.1.1	Express numbers between one-billionth and one billion in fraction, decimal, and verbal form; express numbers of all magnitudes in scientific notation
9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.3.1	Construct appropriate displays of given data
9-10.3.2	Interpret a given visual representation of a set of data
9-10.3.3	Identify the variable, sample, and population in a well-designed study
9-10.3.7	Calculate measures of central tendency and spread
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
11-12.3.2	Make predictions based on theoretical probabilities and experimental results
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure
9-10.4.3	Use approximations to compare the standard and metric systems of measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.8	Given a formula list, compute the area of a regular polygon
9-10.4.9	Given a formula list, compute the surface area and volume of a right prism, right cylinder, right pyramid, right cone, and sphere
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.2	Express relations and functions using a variety of representations
9-10.5.4	Perform the operations of addition, subtraction, multiplication, and division on algebraic functions

Mathematics (cont.)

9-10.5.7	Develop algebraic expressions, equations, or inequalities involving one or two variables to represent relationships found in various contexts
9-10.5.8	Manipulate algebraic expressions and equations using properties of real numbers
9-10.5.10	Solve a literal equation for a specified variable
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled

Standard 4: COMPONENTS OF PLANT GROWTH – Understand the major components for plant growth.

Academic Cross Walk

Science

9-10.1.1	Understand the interaction of components within a system
9-10.6.1	Use appropriate technologies and techniques to solve a problem
11-12.1.1	Understand the structure, organization, and dynamics of components within a system
9-10.2.2	Identify questions and concepts that guide scientific investigations
9-10.2.3	Formulate a testable hypothesis for a simple investigation
9-10.2.5	Design and conduct a guided investigation
9-10.2.7	Analyze data found in tables, charts, and graphs to formulate conclusions
11-12.2.2	Select and use appropriate instruments, measuring tools, and units of measure to improve scientific investigations
11-12.2.4	Formulate and revise explanations based upon scientific knowledge and experimental data
11-12.2.6	Analyze data using appropriate strategies
11-12.2.7	Design and conduct an independent investigation
9-10.3.1	Classify elements according to similar properties
11-12.6.1	Select and use appropriate technologies, tools, and techniques to solve a problem

Standard 5: PLANT PRODUCTION PROBLEMS – Relate problems to plant production.

Topic 1: Recognize pests and diseases.

Student Competencies

Introductory

5.1.1 Discuss types of pests and diseases as related to plant production (e.g. insects, weeds, disease, etc.).

Core

5.1.2 Implement appropriate management and control of various diseases and pests.

5.1.3 Recognize and explain life cycles of pests.

Advanced

5.1.4 Diagnose a plant problem and determine treatment.

Keys to Employability

Basic Skills

1. Reading→ Locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
2. Writing→ Communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.
3. Arithmetic/Mathematics→ Performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.
4. Listening→ Receives, attends to, interprets, and responds to verbal messages and other cues.
5. Speaking→ Organizes ideas and communicates orally.

Thinking Skills

1. Creative Thinking→ Generates new ideas.
2. Decision Making→ Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.
3. Problem Solving→ Recognizes problems and devises and implements plan of action.
4. Seeing Things in the Mind's Eye→ Organizes, processes symbols, pictures, graphs, objects, and other information.
5. Knowing How to Learn→ Uses efficient learning techniques to acquire and apply new knowledge and skills.
6. Reasoning→ Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Standard 5: PLANT PRODUCTION PROBLEMS – Relate problems to plant production.

Topic 2: Understand concepts of chemical application and sanitization for pest control

Student Competencies

Introductory

5.2.1 Classify chemical types (e.g. pesticides, herbicides, insecticides, etc.).
5.2.2 Explain safety precautions (e.g. regulations/laws, safe handling, storage, transportation, first aide, etc.).
5.2.3 Read and interpret pesticide labels.

Core

5.2.4 Demonstrate safety in handling and applying chemicals.
5.2.5 Calculate application rates.
5.2.6 Assess plant uptake of chemicals.
5.2.7 Discuss methods for contamination prevention (e.g. proper temperature, bleach mixture for equipment sterilization).
5.2.8 Recognize carriers of contamination (e.g. insects, environmental such as visitors, broken equipment, residual chemicals, etc.).

Advanced

5.2.9 Recommend appropriate chemicals for specific situations (e.g. application rates, pests, diseases, etc.).
5.2.10 Calibrate equipment for correct application rates.

Keys to Employability

Personal Qualities

1. Responsibility→ Exerts a high level of effort and perseveres towards goal attainment.
2. Self-Esteem→ Believes in own self worth and maintains a positive view of self.
3. Sociability→ Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group setting.
4. Self-Management→ Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
5. Integrity/Honesty→ Chooses ethical courses of action.

Resources

1. Time→ Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules.
2. Money→ Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
3. Material and Facilities→ Acquires, stores, allocates, and uses materials or space efficiently.
4. Human Resources→ Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Information

1. Acquires and Evaluates Information.
2. Organizes and Maintains Information.
3. Interprets and Communicates Information.
4. Uses Computers to Process Information.

Standard 5: PLANT PRODUCTION PROBLEMS – Relate problems to plant production.

Topic 3: Examine concepts of Integrated Pest Management (IPM).

Student Competencies

Introductory

5.3.1 Define IPM.

5.3.2 Discuss the various types of controls (e.g. biological, cultural, chemical, etc.).

Core

5.3.3 List examples of different kinds of controls to a specific problem.

5.3.4 Analyze a pest control program.

Advanced

5.3.5 Design and implement a pest control program.

Keys to Employability

Interpersonal

1. Participates as a Member of a Team→ Contributes to group effort.
2. Teaches Others New Skills.
3. Serves Clients/Customers→ Works to satisfy customers' expectations.
4. Exercises Leadership→ Communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
5. Negotiates→ Works toward agreements involving exchange of resources; resolves divergent interests.
6. Works with Diversity→ Works well with men and women from diverse backgrounds.

Systems

1. Understands Systems→ Knows how social, organizational, and technological systems work and operates effectively with them.
2. Monitors and Corrects Performance→ Distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions.
3. Improves or Designs Systems→ Suggests modifications to existing systems and develops new or alternative systems to improve performance.

Technology

1. Selects Technology→ Chooses procedures, tools, or equipment including computers and related technologies.
2. Applies Technology to Task→ Understands overall intent and proper procedures for setup and operation of equipment.
3. Maintains and Troubleshoots Equipment→ Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Standard 5: PLANT PRODUCTION PROBLEMS—Relate problems to plant production.

Academic Cross Walk

English Language Arts

9.1.1	Choose a broad topic, state the problem, or question
9.1.3	Cross-reference information
9.1.4	Evaluate relevancy of information
9.1.5	Organize information from a variety of sources
9.1.6	Summarize information
9.1.7	Identify and avoid plagiarism
9.1.9	Use graphic organizer
10.1.1	Form questions to focus research
10.1.2	Know ways to effectively search electronic databases
10.1.3	Gather reliable information to support a thesis
10.1.4	Use relevant information
10.1.5	Organize information from a variety of sources into a unified whole
10.1.7	Paraphrase information
10.1.10	Write a research paper
10.1.11	Present research information
11.1.1	Research topics independently using appropriate sources
11.1.2	Evaluate and incorporate information from primary sources
11.1.4	Verify the quality, accuracy, and usefulness of information
11.1.5	Synthesize information in a logical sequence
12.1.1	Plan a research strategy
12.1.3	Develop a research question
12.1.4	Defend research paper or project
9.2.6	Demonstrate oral reading fluency
9.2.7	Access prior knowledge to interpret meaning
9.2.12	Explain ways in which the setting affects the development of a story
10.2.7	Apply universal themes to real life situations
11.2.6	Apply prior knowledge of content to interpret meaning of text
12.2.8	Use technical language/jargon to decipher meaning
9.3.3	Develop a composition detailing an opinion
9.3.5	Organize the ideas and details of a composition according to purpose
9.3.8	Use supporting details
9.3.11	Arrange paragraphs in a logical progression
9.3.12	Use technology to present written work
10.3.2	Defend a personal opinion using facts as support
10.3.4	Organize the ideas and details of a composition according to purpose
10.3.7	Use a variety of supporting details
10.3.10	Use a specific point of view in compositions
11.3.2	Organize the ideas and details of a composition according to purpose

English Language Arts (cont.)

11.3.3	Elaborate ideas through word choice and description using grade-level vocabulary
11.3.5	Use a variety of supporting details
11.3.8	Incorporate visual aids into written work to enhance meaning
12.3.4	Use variety of sources for supporting details
12.3.5	Elaborate ideas through word choice and description using grade-level vocabulary

Standard 5: PLANT PRODUCTION PROBLEMS—Relate problems to plant production.

Academic Cross Walk

Library/Technology Literacy

12.1.1	Define a research problem or task
12.1.2	Plan a research strategy
12.1.3	Access information using a variety of sources
12.1.4	Use a variety of criteria to evaluate and select information for research
12.1.5	Use organizational strategies to record and synthesize information
12.1.6	Present research
12.1.7	Evaluate the research process
12.2.1	Demonstrate awareness of audience when creating media products
12.2.2	Synthesize information to create a product that meets a specific need
12.2.3	Use a variety of criteria to evaluate media products
12.2.4	Use a variety of media and technology to communicate with communities beyond the school
12.3.1	Explain and use appropriate terminology and concepts associated with media and technology
12.3.2	Demonstrate advanced knowledge and skills in various media and technology
12.3.3	Apply strategies for identifying and solving routine hardware and software problems
12.3.4	Explain features and uses of current and emerging media and technology
12.4.1	Work cooperatively and collaboratively when using media and technology
12.4.2	Develop competence and selectivity in reading, listening, and viewing
12.4.3	Demonstrate self-motivation in seeking information
12.4.4	Use a variety of media and technology for personal needs and enjoyment
12.5.1	Follow school policies for responsible use of information resources
12.5.2	Demonstrate proper form of citations and bibliographies
12.5.3	Understand and obey intellectual property laws, including copyright, when using information in any format
12.5.4	Understand the impact of equitable access to information in a democracy

Mathematics

9-10.1.1	Express numbers between one-billionth and one billion in fraction, decimal, and verbal form; express numbers of all magnitudes in scientific notation
9-10.1.7	Apply basic properties of exponents to simplify algebraic expressions
9-10.1.8	Apply estimation skills to predict realistic solutions to problems
9-10.1.9	Select and use a computational technique to solve problems involving real numbers
9-10.1.10	Explain the reasonableness of a problem's solution and the process used to obtain it
11-12.1.7	Add, subtract, and multiply complex numbers
9-10.3.1	Construct appropriate displays of given data
9-10.3.2	Interpret a given visual representation of a set of data
9-10.3.3	Identify the variable, sample, and population in a well-designed study
9-10.3.7	Calculate measures of central tendency and spread
11-12.3.1	Choose, construct, and interpret a display to represent a set of data
11-12.3.2	Make predictions based on theoretical probabilities and experimental results
9-10.4.1	Select appropriate units and scales for problem situations involving measurement
9-10.4.2	Describe the effects of scalar change on the area and volume of a figure
9-10.4.3	Use approximations to compare the standard and metric systems of measurement
9-10.4.4	Given a conversion factor, convert between standard and metric measurements
9-10.4.5	Use methods necessary to achieve a specified degree of precision and accuracy in measurement situations
9-10.4.6	Employ estimation techniques to evaluate reasonableness of results in measurement situations
9-10.4.8	Given a formula list, compute the area of a regular polygon
9-10.4.9	Given a formula list, compute the surface area and volume of a right prism, right cylinder, right pyramid, right cone, and sphere
9-10.4.10	Apply indirect measurement techniques to solve problems involving irregular shapes or inaccessible objects
9-10.5.2	Express relations and functions using a variety of representations

Standard 5: PLANT PRODUCTION PROBLEMS—Relate problems to plant production.

Academic Cross Walk

Mathematics (cont.)

9-10.5.4	Perform the operations of addition, subtraction, multiplication, and division on algebraic functions
9-10.5.7	Develop algebraic expressions, equations, or inequalities involving one or two variables to represent relationships found in various contexts
9-10.5.8	Manipulate algebraic expressions and equations using properties of real numbers
9-10.5.10	Solve a literal equation for a specified variable
9-10.5.13	Interpret a graphical representation of a real-world situation
9-10.5.14	Draw conclusions about a situation being modeled

Science

None listed.